

App. No. 10/651,849
Amendment Dated December 14, 2005
Reply to Office Action of September 14, 2005

REMARKS/ARGUMENTS

Claims 1-21 are pending in this application. The Office Action, dated September 14, 2005, rejected claims 1-9, 13, and 15-21 under 35 U.S.C. § 102(b). Claims 11-12 are objected to. Claims 11 and 13 have been amended to further clarify the invention without changing the scope of the claims. No new subject matter has been added. For at least the following reasons, Applicants respectfully submit that the pending claims as amended are in condition for allowance, and notice to that effect is requested.

Allowable Subject Matter

Claims 10-12 and 14 are objected to as dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant wishes to thank the Examiner for the indication of allowable subject matter. Claims 10 and 14 have been amended to include the limitations of the base claim. Claims 11 and 12 depend upon and further limit claims 10, and should be allowable for at least that reason. Claims 10 - 12 and 14 are believed to be in proper form for allowance and notice to that effect is requested. For the reasons that follow-below with respect to claim 1, it is believed that the scope of the subject matter sought to be patented by claims 10 - 12 and 14 is not changed by this amendment.

Objected claims 11, 12 and 14

The Office Action objected to claims 10 - 12 for various informalities. Namely, claim 10 included a typographical error that has been corrected. Claims 11 - 12 depend upon claim 10

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and are objected to on that basis. Claims 10 – 12 are believed to be in proper form and notice to that effect is respectfully requested.

Rejection of claims 1-9, 13 and 15-21 under 35 U.S.C. § 102(b)

Claims 1-2, 13 and 15-21 under 35 U.S.C. § 102(b) as being anticipated by *Gilbert* (U.S. Patent No. 5,077,541). Claims 1, 15, 18, 20 and 21 have been amended and are now believed to be in condition for allowance. Claims 2, 13, 16, 17 and 19 depend from claims 1, 15 and 18.

Applicant's claim 1 recites at least the following limitations that are not found in the cited references, and specifically not found in the *Gilbert* patent ('541):

"a first stage circuit that includes an array of amplifier circuits, wherein each of the amplifier circuits includes: an offset adjustment circuit, an output that is coupled to a common node, an input that is arranged to receive a feedback signal, and a null control input that is arranged to receive a respective null control signal such that the offset adjustment circuit for a respective one of the amplifier circuits is responsive to the respective null control signal;

...

a feedback circuit that is arranged to provide the feedback signal in response to the reference signal, wherein the feedback circuit includes a band-gap core circuit;
and

a null control logic circuit that is arranged to provide a set of null control signals, where each null control signal is associated with a respective one of the amplifier circuits such that the amplifier circuits are selectively zeroed to minimize the effects of offset in each of the amplifier circuits."

The Office Action states that *Gilbert* discloses, in Figs. 3 and 4, a circuit comprising: "a first stage means (36) that includes an array of amplifier circuit(6)"; each amplifier including an

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offset adjustment circuit (I) ... and a null control means (R_S)". The Applicant has carefully reviewed the Gilbert reference and does not find a structure or teaching that agrees with this interpretation. Gilbert describes that FIG. 3 is a further detailed version of the schematic illustrated by FIG. 2, where circuit component 36 is a transconductance stage, where the gm of each transconductance stage is varied by a respective control current from the gain control circuit (See. Col. 3, lines 32-34). Gilbert continues to describe that current I is a biasing current for each of the transconductance stages, while resistor R_S is a base resistor that provides biasing to each base along a parabolic curve (see. Col. 3, lines 60-67). The biasing current is provided as a tail current (as is understood in the art) to the transconductance stage. The biasing current can thus be varied such that the transconductance parameter of each transconductance stage varies (see Gilbert, col. 3 - 4, lines 50 - 7). As such, Gilbert does not teach **adjusting an offset** associated with an amplifier stage, but instead teaches to variably adjust the transconductance of each transconductance stage. In fact, since the biasing current is provided as a **single current** to the tail (a term understood in the art) of the transconductance stage, any offset that is found in the transconductance stage will not be knowingly "nulled" by adjusting the tail current of the transconductance stage. The Gilbert reference further described that the purpose of adjusting the currents is that "interpolating currents for the gm stages 36 overlap" such that "the resulting net gain will lie somewhere between the two values ..." and gain is "gradually transferred from one gm stage to the next" so that "the gain can be made to slide from that obtained at one tap point to that at an adjacent tap point." (see Gilbert at col. 4 - 5, lines 62 - 2). The essential purpose of operation, and methods of operation of the circuits found in Gilbert do not teach offset adjustment in response to a null control signal in a manner as found in Applicant's claim 1.

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The Office Action also states that Gilbert discloses, in Figs. 3 and 4, a circuit comprising: "a feedback means (feedback resistor, R, RT and resistor between 38 and RT)" and that since "the feedback arrangement would provide a band-gap operation, it would have been more than reasonable to consider the feedback means to be a band-gap core circuit." The Applicant has again carefully reviewed the Gilbert reference and does not find a structure or teaching that agrees with this interpretation. Gilbert describes that the described circuit is a variable gain amplifier (VGA), where the gain adjustment for the VGA can be continuously varied between gain settings from one transconductance stage to another transconductance stage. The gain adjustment is achieved with a resistor ladder (20) that has resistors R and RT providing successively greater attenuated values of the signal output at various tap points in the resistor ladder (*See* Gilbert, col. 3, lines 25-34).

There is no disclosure in the schematics, nor in the text of the Gilbert reference that suggests or teaches a band-gap core as is understood in the art. The text of the patent has been explicitly searched for the terms "band gap", "band-gap", and "core", none of which appear in the reference. Moreover, the principal of operation of a band-gap core is to maintain a voltage drop across a resistor that is an effective measure of the change in base-emitter voltages between two transistors in a common base configuration operating with different current densities. The proposed use of a band-gap core in the feedback circuit of a variable gain amplifier would destroy the operation of the circuit taught in Gilbert as a variable gain amplifier. As such, it is not conceivable that the aforementioned features are taught or otherwise suggested in Gilbert, and instead these features are only found in Applicant's claim 1.

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For at least the reasons stated above, claim 1 is submitted to be patentable and allowance is solicited. Claims 2 – 9 and 13 depend upon and further limit claim 1, and should be allowable for that reason as well as any additional limitations they recite. Claims 1 – 9 and 13 are proposed to be allowable and notice to that effect is requested.

Applicant's claim 15 recites at least the following limitations that are not found in the cited references, and specifically not found in the Gilbert patent ('541):

"a first amplifier means that includes a first offset adjustment circuit, a first output that is coupled to a common node, a first input that is arranged to receive a feedback signal, and a first null control input that is arranged to couple a first null control signal to the first offset adjustment circuit;

a second amplifier means that includes a second offset adjustment circuit, a second output that is coupled to the common node, a second input that is arranged to receive the feedback signal, and a second null control input that is arranged to couple a second null control signal to the second offset adjustment circuit;

a third amplifier means that includes a third offset adjustment circuit, a third output that is coupled to the common node, a third input that is arranged to receive the feedback signal, and a third null control input that is arranged to couple a third null control signal to the third offset adjustment circuit;

...

a feedback means that is arranged to provide the feedback signal in response to the reference signal, wherein the feedback means includes a band-gap core means;
and

a null control means that is arranged to provide the first, second, and third null control signals such that an offset voltage associated with one of the first, second, and third amplifiers means is selectively zeroed in response to the respective one of the first,

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second, and third null control signals while the others of the first, second, and third amplifier means are not zeroed.”

Claim 15 contains similar limitations to that described with respect to claim 1, and is proposed to be allowable for at least those same reasons described previously. Additionally, the null control means described in Applicant's claim 15 describes that the “null control means” is arranged such that “one of ...the ... amplifier means is selectively zeroed ... while the others ... are not zeroed”, which is clearly not taught in the Gilbert reference. As such, it is proposed that claim 15 is allowable, and notice to that effect is requested. Claims 16 – 19 depend upon and further limit claim 15, and should be allowable for at least that reason as well as any further limitations they recite. Claims 15 – 19 are in proper form for allowance and notice to that effect is requested.

Applicant's claim 20 recites at least the following limitations that are not found in the cited references, and specifically not found in the Gilbert patent ('541):

“20. A method for reducing the offset voltage associated with a reference signal, comprising:

coupling together the outputs from an array of amplifier circuits at a common node to provide an intermediate signal, wherein each of the amplifier circuits includes an offset adjustment circuit therein;

...

providing a feedback signal to the array of amplifier circuits in response to the reference signal, wherein the feedback signal is associated with a band-gap core circuit;

selecting one of the array of amplifier circuits for offline operation;

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nulling an offset voltage associated with the selected amplifier circuit while the selected amplifier circuit is in offline operation; and
maintaining the non-selected amplifier circuits such that the offset voltage associated with the reference signal is zeroed as an average.”

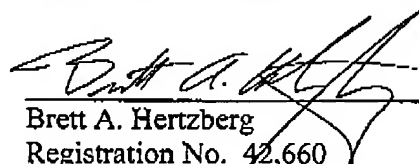
Claims 20 and 21 contain similar limitations to that described with respect to claims 1 and 15 previously described above, and is proposed to be allowable for at least those same reasons described previously. Additionally, the “selecting” of an amplifier “for offline operation”, and “nulling” of the offset voltage for the “selected amplifier” during the offline operation are clearly not taught by the Gilbert reference. Since Gilbert has no teaching, suggestion, or other motivation to distinguish between offline and online operation of amplifiers as found in Applicant’s claim 20, it is also unclear how Gilbert could possibly teach “maintainng the non-selected amplifier circuits” to zero the average offset voltage associated with the reference signal. For at least the above stated reasons, it is proposed that claim 20 is allowable, and notice to that effect is requested. Claim 21 depends upon and further limits claim 20, and should be allowable for at least that reason as well as any further limitations recited. Claims 20 – 21 are in proper form for allowance and notice to that effect is requested.

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In view of the foregoing amendments and remarks, all pending claims are believed to be allowable and the application is in condition for allowance. Therefore, a Notice of Allowance is respectfully requested. Should the Examiner have any further issues regarding this application, the Examiner is requested to contact the undersigned attorney for the applicant at the telephone number provided below.

Respectfully submitted,

MERCHANT & GOULD P.C.


Brett A. Hertzberg
Registration No. 42,660
Direct Dial: 206.342.6255

MERCHANT & GOULD P.C.
P. O. Box 2903
Minneapolis, Minnesota 55402-0903
206.342.6200
BAH/ab

